Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a biochip carrier having a surface which comprises photoactivatable groups located on predetermined areas of said biochip carrier surface, an illumination matrix and a detector which comprises a light sensor matrix, wherein said light sensor matrix and said illumination matrix are arranged facing each other and said biochip carrier is situated in the light path between said illumination matrix and said light sensor matrix;

(b) activating said photoactivatable groups on at least a predetermined area of said biochip carrier surface by location-specific illumination of said predetermined area of said biochip carrier surface using said illumination matrix to generate an adjustable location-specific illumination pattern;

(c) detecting said location-specific illumination ~~pattern~~ using a light sensor matrix and optionally adjusting said illumination pattern;

(d) binding ~~said biologically or chemically functional~~ materials selected from the group consisting of (1) biologically functional materials, (2) chemically functional materials, (3) building blocks for said biologically functional materials and (4) building blocks for said chemically functional ~~or building blocks for said~~ materials on said predetermined area of said biochip carrier surface; and

(e) repeating the activating, detecting and binding steps on the same or a different predetermined area of said biochip carrier surface.

2. (Previously presented) The method of claim 1, wherein said illumination is with electromagnetic radiation selected from the group consisting of infrared, visible, ultraviolet and X-ray radiation.

3. (Currently amended) The method of claim 1, wherein said biochip carrier is illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

4. (Previously presented) The method of claim 1, wherein different predetermined areas are illuminated in parallel.

5. (Previously presented) The method of claim 1, wherein said illumination matrix is a reflection matrix having a controllably deformable mirror arrangement.

6. (Previously presented) The method of claim 5, wherein said reflection matrix is selected from the group consisting of a light modulator with viscoelastic control layers and a light modulator with micromechanical mirror arrays.

7. (Previously presented) The method of claim 1, wherein said illumination matrix is prepared on a chip and comprises a light source selected from the group consisting of a laser array and a diode array.

8. (Previously presented) The method of claim 1, wherein said biochip carrier is an optically transparent carrier.

9. (Previously presented) The method of claim 1, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

10. (Previously presented) The method of claim 1, wherein said predetermined area is from 1 μm^2 to 1 cm^2.

11. (Currently amended) The method of claim 1, wherein said predetermined area is surrounded by nonactivated ~~or nonactivatable~~ areas.

12. (Canceled).

13. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials react with biological substances.

14. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

15. (Currently amended) The method of claim 1, wherein said biologically or chemically functional materials are synthesized on said biochip carrier in two or more stages from monomeric or oligomeric building blocks.

16. (Previously presented) The method of claim 1, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

17. (Currently amended) The method of claim 1, wherein said activating photoactivatable groups comprises cleaving a protective group on said at least a predetermined area of said biochip carrier surface.

18. (Previously presented) The method of claim 1, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

19-20. (Canceled herein)

21. (Currently amended) The method of claim 1, wherein said biochip carrier is precalibrated using the illumination matrix and light sensor matrix.

22. (Currently amended) The method of claim 1, which further comprises ~~at least partially~~ removing materials bound on the carrier.

23. (Currently amended) The method of claim 22, wherein said materials or said building blocks bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers.

24-26. (Canceled).

27. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a biochip carrier having a surface which comprises photoactivatable groups located on predetermined areas of said biochip carrier surface and a UV light source array comprising a plurality of individually controllable light sources;

(b) activating said photoactivatable groups on at least a predetermined area of said biochip carrier surface by location-specific illumination of said predetermined area of said biochip carrier surface using said UV light source array to generate an adjustable location-specific exposure pattern;

(c) binding ~~said biologically or chemically functional~~ materials selected from the group consisting of (1) biologically functional materials, (2) chemically functional materials, (3) building blocks for said biologically functional materials and (4) building

blocks for said chemically functional ~~or building blocks for said~~ materials on said predetermined areas of said biochip carrier surface; and

(d) repeating the activating and binding steps on the same or different predetermined areas of said biochip carrier surface.

28. (Previously presented) The method of claim 27, which further comprises detecting said illumination pattern using a light sensor matrix and optionally adjusting said illumination pattern.

29. (Previously presented) The method of claim 28, wherein said light sensor matrix is a CCD matrix.

30. (Currently amended) The method of claim 27, wherein said biochip carrier is illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

31. (Previously presented) The method of claim 27, wherein different predetermined areas are illuminated in parallel.

32. (Previously presented) The method of claim 27, wherein said biochip carrier is an optically transparent carrier.

33. (Previously presented) The method of claim 32, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

34. (Previously presented) The method of claim 27, wherein said predetermined areas are from 1 μm^2 to 1 cm^2.

35. (Previously presented) The method of claim 34, wherein said predetermined areas are from 100 μm^2 to 1 mm^2.

36. (Currently amended) The method of claim 27, wherein said predetermined areas are surrounded by nonactivated ~~or nonactivatable~~ areas.

37. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials react with biological substances.

38. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides, proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

39. (Currently amended) The method of claim 27, wherein said biologically or chemically functional materials are synthesized on said biochip carrier in two or more stages from monomeric or oligomeric building blocks.

40. (Previously presented) The method of claim 27, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

41. (Currently amended) The method of claim 27, wherein said activating photoactivatable groups comprises cleaving a protective group on said predetermined areas of said biochip carrier surface.

42. (Previously presented) The method of claim 27, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

43. (Previously presented) The method of claim 42, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

44. (Currently amended) The method of claim 27, which further comprises ~~at least partially~~ removing materials bound on the carrier.

45. (Currently amended) The method of claim 44, wherein said materials or said building blocks bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers.

46. (Previously presented) The method of claim 1, wherein said light sensor matrix is a CCD matrix.

47. (Previously presented) The method of claim 1, wherein said biochip carrier has a surface selected from the group consisting of silicon, germanium arsenide and gallium arsenide.

48. (Previously presented) The method of claim 9, wherein said glass is quartz glass.

49. (Previously presented) The method of claim 10, wherein said predetermined area is from 100 μm^2 to 1 mm^2.

50. (Previously presented) The method of claim 18, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

51. (Currently amended) The method of claim ~~22~~ 1, wherein said materials bound on the biochip carrier are selected from the group consisting of nucleic acids, nucleic acid analogs and proteins.

52. (Currently amended) The method of claim ~~23~~ 1, wherein said polymers are nucleic acid polymers.

53-55. (Canceled herein)

56. (Currently amended) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a biochip carrier having a surface which comprises photoactivatable groups located on predetermined areas of said biochip carrier surface and a UV light source array comprising a plurality of individually controllable light sources;

(b) activating said photoactivatable groups by location-specific illumination of said predetermined area of said biochip carrier surface using said UV light source array to generate an adjustable location-specific exposure pattern of illumination;

(c) detecting said adjustable location-specific exposure pattern of illumination ~~pattern~~ using a light sensor matrix and optionally adjusting said adjustable location-specific exposure pattern of illumination ~~pattern~~;

(d) binding ~~said biologically or chemically functional~~ materials selected from the group consisting of (1) biologically functional materials, (2) chemically functional materials, (3) building blocks for said biologically functional materials and (4) building blocks for said chemically functional ~~or building blocks for said~~ materials on said predetermined areas of said biochip carrier surface; and

(e) repeating the activating and binding steps on the same or different predetermined areas of said biochip carrier surface, wherein said UV light source array is selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array.

57. (Previously presented) A method of claim 27 wherein said UV light source array is selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array.